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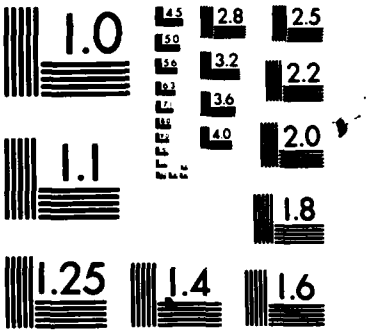

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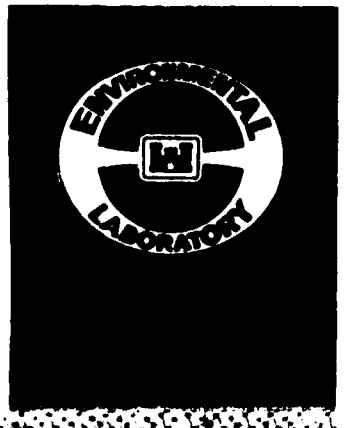

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BEAVER POND MANAGEMENT

Section 5.5.2, US ARMY CORPS OF ENGINEERS WILDLIFE RESOURCES MANAGEMENT MANUAL

by

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19 ABSTRACT (Continue on reverse if necessary and identify by block number)

A management techniques report on beaver pond management is provided as Section 5.5.2 of the US Army Corps of Engineers Wildlife Resources Management Manual. The report was prepared as a guide to assist Corps biologists and resource managers in developing and implementing techniques for waterfowl management on project lands. Topics covered for beaver ponds include site selection, draining the pond, planting, reflooding, personnel and costs, and cautions and limitations.

Ponds created by beavers (*Castor canadensis*) satisfy many needs for waterfowl as roosting, resting, nesting, and foraging habitat. Thus, these ponds provide opportunities for waterfowl management. A technique consisting of draining a pond and planting Japanese millet (*Echinochloa crusgalli*) is described in this report; the procedure has been widely used in the South and should be feasible throughout the range of Japanese millet. Recommendations are provided for evaluating potential management sites, constructing and installing drainage structures, planting, and reflooding.

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PREFACE

This work was sponsored by the Office, Chief of Engineers (OCE), US Army, as part of the Environmental Impact Research Program (EIRP), Work Unit 31631, entitled Management of Corps Lands for Wildlife Resource Improvement. The Technical Monitors for the study were Dr. John Bushman and Mr. Earl Eiker, OCE, and Mr. Dave Mathis, Water Resources Support Center.

This report was prepared by Mr. James W. Teaford, Wetlands and Terrestrial Habitat Group (WTHG), Environmental Laboratory (EL), US Army Engineer Waterways Experiment Station (WES). Mr. Chester O. Martin, Team Leader, Wildlife Resources Team, WTHG, was principal investigator for the work unit. Review and comments were provided by Mr. Martin and Dr. Wilma A. Mitchell, WTHG, and Dr. Kenneth T. Ridlehuber, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Tex. The report was prepared under the general supervision of Dr. Hanley K. Smith, Chief, WTHG, EL; Dr. Conrad J. Kirby, Chief, Environmental Resources Division, EL; and Dr. John Harrison, Chief, EL. Dr. Roger T. Saucier, WES, was Program Manager, EIRP. The report was edited by Ms. Jessica S. Ruff of the WES Publications and Graphic Arts Division (PGAD).

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NOTE TO READER

This report is designated as Section 5.5.2 in Chapter 5 -- MANAGEMENT PRACTICES AND TECHNIQUES, Part 5.5 -- WETLAND HABITAT MANAGEMENT, of the US ARMY CORPS OF ENGINEERS WILDLIFE RESOURCES MANAGEMENT MANUAL. Each section of the manual is published as a separate Technical Report but is designed for use as a unit of the manual. For best retrieval, this report should be filed according to section number within Chapter 5.

BEAVER POND MANAGEMENT

Section 5.5.2, US ARMY CORPS OF ENGINEERS
WILDLIFE RESOURCES MANAGEMENT MANUAL

Ponds created by beavers (*Castor canadensis*) satisfy many needs for waterfowl as roosting, resting, nesting, and foraging habitat; thus, these ponds provide opportunities for waterfowl management. Management for roosting and resting ducks is passive and requires only that adequate water be present and that disturbance be minimal. Recommendations for nesting cavities and brood habitat for wood ducks (*Aix sponsa*) are given in the section on wood duck nest boxes.

Arner (1963) developed a technique to enhance the attractiveness of beaver ponds as foraging areas for ducks. This technique, which consists of draining a pond and planting Japanese millet (*Echinochloa crusgalli*), has been widely used in the South and should be feasible throughout the range of Japanese millet. The basic technique and some additional considerations are presented here.

SITE SELECTION

The first step in beaver pond management is to evaluate potential sites and determine the best alternative for each. Beavers and beaver ponds add variety and diversity to the landscape, and many ponds should be left in their natural state. One should consider the value of a pond as waterfowl breeding habitat for species such as black ducks (*Anas rubripes*), mallards (*A. platyrhynchos*), wood ducks, and hooded mergansers (*Lophodytes cucullatus*). The value of a pond as habitat for plants, fishes, furbearers, and nongame wildlife should be considered as well.

For those ponds tentatively selected for management, consideration should be given to access, use of native versus cultivated vegetation, and water level control. Ponds must be relatively accessible in order to get seed and equipment to the site and to facilitate periodic inspections. On some ponds, managing for native vegetation may be preferable to planting millet. The degree and timing of water level control for a particular pond is critical. If possible, a pond managed as a duck foraging area should have at least 1 full pond upstream to serve as a source of water for reflooding in dry years.

Before draining a beaver pond, one should ensure that the area will be suitable for planting millet. The pond should be relatively free of submersed and rooted emergent aquatic plants that would cover the mud after drawdown and prevent the millet seed from rooting properly. A minimal area of at least 1 acre of exposed mud that will be relatively shallow when reflooded (2 to 30 in. deep) should be available. Most trees in the pond should be dead so that the developing stand of millet will receive adequate sunlight for proper growth (Arner 1963).

DRAINING THE POND

Once a suitable pond is located, it should be drained as completely as possible by breaking the dam at the main channel (Arner 1963) (Fig. 1). Start on the downstream side, and notch about halfway through from the base to the top of the dam without causing a waterflow (the adz side of a mattock is ideal to use for chopping through the sticks and mud of the dam). Once the initial notch is cut, make a break at the top of the dam to start the water flowing. Work down, using the force of the rushing water to clear away the mud and debris as it is loosened. The break should be made in the form of a deep, narrow V to facilitate the installation of a 3-log drain (Arner 1963). Drainage time varies with the size of the impoundment; 4 to 10 hours are needed for a 5- to 10-acre pond. If the break is made in the morning, the pond will probably drain by nightfall since beavers rarely repair dams during the day.

After the waterflow has slowed and the area to be planted has been exposed, a drainage structure should be installed in the dam break to prevent beavers from reflooding the pond to its original level. Bailey's 3-log drain (Bailey 1927), as modified by Arner (1963) (Fig. 1), is a relatively simple and inexpensive option when suitable trees (green, 6 to 9 in. in diameter, and 10 to 16 ft long) are available at the site. If suitable trees are not available

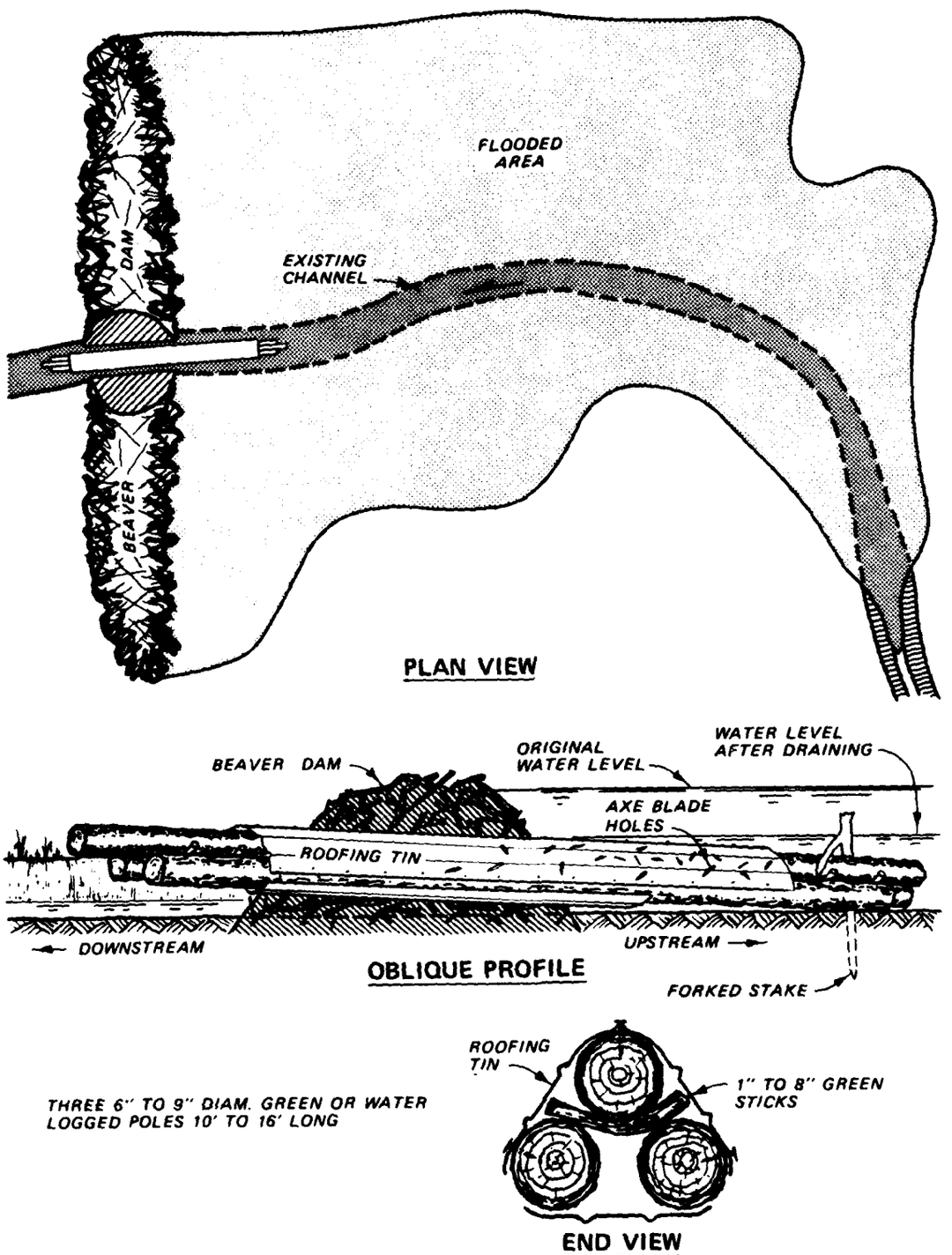

Figure 1. Construction and placement details for a 3-log drain used for draining beaver ponds (after Arner 1963)

nearby, one could build and use a 3-pipe drain constructed of perforated plastic pipe and newsprint aluminum. The plastic pipe drain can be covered with aluminum newsprint sheets (Fig. 2) or left uncovered (Fig. 3); local experimentation with the design of this drain is recommended to determine the best option for a particular situation.

The upstream or intake end of the drain should be securely fastened in place to keep it under water. This may nullify or at least delay the beavers' efforts to halt the waterflow through the dam after they repair the break. However, it is unlikely that either drain design will prevent the beavers from eventually stopping the flow of water through the dam; thus, one should periodically inspect the site to make sure that adequate drainage is maintained.

PLANTING

As soon as mudflats are exposed and the seeds will not float off, the area should be planted. Arner et al. (1966) recommended planting Japanese millet at the rate of 20 lb/acre when the mud is about ankle deep. It is important that the ground be moist for germination and adequate early growth of the millet.

Two varieties of Japanese millet (*chiwapa* and *frumentacea*) are available commercially. The *chiwapa* variety matures in 80 to 90 days, with an average yield of approximately 1850 lb seed/acre; the *frumentacea* variety matures in 45 to 65 days, with an average yield of approximately 2100 lb/acre (Wesley 1975, Johnson et al. 1976). Other millets, such as browntop millet (*Panicum ramosum*) will not grow in the moist soil conditions typical of drained beaver ponds and should not be substituted for Japanese millet.

Planting dates vary with location. In Wisconsin, Japanese millet has been planted from May 15 to July 20, but these are the extremes; recommended dates are June 10 to 28 (Linde 1969). In Connecticut, the best period for planting is June 10 to 20 (McLain 1957). In the South, millet can be planted from May until late August, depending on the variety. Whenever possible, it is recommended that the early maturing *frumentacea* variety be selected and planted sometime from mid-July to mid-August. Waiting as late as possible to drain and plant a beaver pond will help maintain the area as brood habitat for late-hatching wood ducks as well as help eliminate weed competition.

Figure 2. Covering a perforated plastic 3-pipe drain with aluminum newsprint sheets

Figure 3. View of an uncovered, perforated plastic 3-pipe drain installed in a beaver dam break

REFLOODING

Water should be kept off the area until the millet becomes established. The drain should be checked and maintained frequently until the plants average about 1 ft in height. From this stage until maturity, the millet will tolerate and grow well in water that averages 1/4 to 1/2 the total plant height (Fig. 4). In areas subject to armyworm (larvae of the moth Family Noctuidae) infestations, incremental flooding of the growing millet may help reduce damage by creating a movement barrier for the young caterpillars. In Wisconsin, Linde (1969) also recommended incremental flooding to provide waterfowl brood cover and to help prevent frost damage; the residual heat of the water apparently protects the millet from frost. As the millet crop approaches maturity (45 to 90 days after planting), beavers should be allowed to reflood the pond to its original depth.

Figure 4. Japanese millet (*Echinochloa crusgalli*) growing in a partially reflooded beaver pond

PERSONNEL AND COSTS

Very few materials are required for draining and planting beaver ponds. High-quality Japanese millet seed (purity of 80% to 85%, germination rate of 70% to 85%) should be used. For 3-log drains, 2 sheets of used roofing tin (2-1/2 by 8 ft) and approximately 1 lb of 10d common nails will suffice. If a plastic pipe drain is used, six 10-ft sections of 4-in. perforated pipe, approximately 20 sheets of newsprint aluminum, 2 pieces of 2-ft-square screen wire to cover the ends, about 1 dozen small sheetmetal screws (used to fasten the pipe sections together), and enough baling wire to securely wire the newsprint aluminum around the plastic pipe are needed.

The labor required to implement this technique will vary according to the size of the beaver dam and pond and the experience of the crew doing the work. At one extreme, this author and a crew of 2 summer laborers broke 2 large beaver dams (each about 10 ft wide at the base and 3 to 5 ft high) and installed pipe drains during a period of three 5-hour workdays; this author's crew planted approximately 10 acres of Japanese millet in a total of approximately 12 man-hours. On the other hand, Arner (1964) reported breaking 6 dams and installing six 3-log drains in an 8-hour day with a 4-man crew.

Inspection and maintenance requirements vary with the accessibility of the site and the amount of water normally flowing into the pond. One to 2 man-hours per day for the first few days may be necessary to ensure that the millet becomes established. Thereafter, 1 to 2 man-hours per week should be sufficient if the pond is allowed to partially reflood.

CAUTIONS AND LIMITATIONS

Safety is a primary consideration in implementing this technique. The work is conducted in and around water which is normally relatively shallow but may be deep in spots. Caution must be exercised to protect workers from poisonous snakes, as beaver dams make excellent habitat for cottonmouths (*Agkistrodon piscivorus*). Also, guarding against heat injury is necessary since this work must be done in summer, often under very hot and humid conditions.

LITERATURE CITED

Arner, D. H. 1963. Production of duck food in beaver ponds. J. Wildl. Manage 27:76-81.

_____. 1964. Research and a practical approach needed in management of beaver and beaver habitat in the southeastern United States. Trans. N. Am. Wildl. and Nat. Resour. Conf. 29:150-158.

_____, J. Baker, and D. Wesley. 1966. The management of beaver and beaver ponds in the southeastern United States. Water Resour. Res. Inst. Bull., Miss. State Univ. 21 pp.

Bailey, V. 1927. Beaver habits and experiments in beaver culture. USDA Tech. Bull. 21. 40 pp.

Johnson, R. C., J. W. Preacher, J. R. Gwaltney, and J. E. Kennamer. 1976. Evaluation of habitat manipulation for ducks in an Alabama beaver pond complex. Proc. Southeast. Assoc. Fish and Wildl. Comm. 29:512-518.

Linde, A. F. 1969. Techniques for wetland management. Wis. Dep. Nat. Res., Madison. 156 pp.

McLain, P. D. 1957. Production of waterfowl foods on impoundments and marshes with low quality soils. Div. Fish and Game, New Jersey Dep. Conserv. and Ecology. Paper presented at Northeast Wild. Conf., New Haven, Conn. 12 pp.

Wesley, D. E. 1975. Using flat-tail's domain. Ducks Unlimited 39(4):18-20, 44.

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